

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-10 (Canceled).

Claim 11 (Currently Amended): A printing system ~~in accordance with claim 1~~ that eventually converts original image data to be printed into dot data as data in unit of dots and prints an image in unit of raster lines as arrays of dots created according to the dot data, said printing system comprising:

a print head that has multiple dot formation elements to create dots on a printing medium;

a print head control module that prints each raster line included in the image by at least two dot formation elements;

an image data conversion module that converts the original image data into converted data, which is in a form prior to expansion into dot data corresponding to the multiple dot formation elements and is in a more compressed form than the dot data;

a converted data storage module that stores the converted data;

a data expansion module that successively reads out the stored converted data and expands the converted data into dot data for actuating the multiple dot formation elements;
and

an output module that outputs the expanded dot data to said print head control module,

wherein said image data conversion module collects a preset number of multiple pixels in the image into each pixel group and specifies a number of dots to be created in each pixel group based on the image data, so as to obtain the converted data,

said converted data storage module stores data representing the specified number of dots to be created in each pixel group as the converted data, and

said data expansion module converts the stored data representing the specified number of dots into the dot data and comprises a dot data storage module, which simultaneously stores the converted dot data at least once with respect to M pixel sets included in each pixel group, where M is an integer of not less than 2 but of less than N, which is a total number of pixel sets included in the pixel group.

Claim 12 (Currently Amended): A printing system ~~in accordance with claim 11~~ that eventually converts original image data to be printed into dot data as data in unit of dots and prints an image in unit of raster lines as arrays of dots created according to the dot data, said printing system comprising:

a print head that has multiple dot formation elements to create dots on a printing medium;

a print head control module that prints each raster line included in the image by at least two dot formation elements;

an image data conversion module that converts the original image data into converted data, which is in a form prior to expansion into dot data corresponding to the multiple dot formation elements and is in a more compressed form than the dot data;

a converted data storage module that stores the converted data;

a data expansion module that successively reads out the stored converted data and expands the converted data into dot data for actuating the multiple dot formation elements;
and

an output module that outputs the expanded dot data to said print head control module,

wherein said image data conversion module collects a preset number of multiple pixels in the image into each pixel group and specifies a number of dots to be created in each pixel group based on the image data, so as to obtain the converted data,

said converted data storage module stores data representing the specified number of dots to be created in each pixel group as the converted data,

said data expansion module converts the stored data representing the specified number of dots into the dot data and comprises a dot data storage module, which simultaneously stores the converted dot data at least once with respect to M pixel sets included in each pixel group, where M is an integer of not less than 2 but of less than N, which is a total number of pixel sets included in the pixel group, and

~~wherein~~ said dot data storage module simultaneously stores dot data with respect to at least multiple pixel sets, in which dots are consecutively created in the pixel group, as the dot data with respect to the M pixel sets.

Claim 13 (Currently Amended): A printing system ~~in accordance with claim 12~~ that eventually converts original image data to be printed into dot data as data in unit of dots and prints an image in unit of raster lines as arrays of dots created according to the dot data, said printing system comprising:

a print head that has multiple dot formation elements to create dots on a printing medium;

a print head control module that prints each raster line included in the image by at least two dot formation elements;

an image data conversion module that converts the original image data into converted data, which is in a form prior to expansion into dot data corresponding to the multiple dot formation elements and is in a more compressed form than the dot data;

a converted data storage module that stores the converted data;

a data expansion module that successively reads out the stored converted data and expands the converted data into dot data for actuating the multiple dot formation elements;
and

an output module that outputs the expanded dot data to said print head control module,

wherein said image data conversion module collects a preset number of multiple pixels in the image into each pixel group and specifies a number of dots to be created in each pixel group based on the image data, so as to obtain the converted data,

said converted data storage module stores data representing the specified number of dots to be created in each pixel group as the converted data,

said data expansion module converts the stored data representing the specified number of dots into the dot data and comprises a dot data storage module, which simultaneously stores the converted dot data at least once with respect to M pixel sets included in each pixel group, where M is an integer of not less than 2 but of less than N, which is a total number of pixel sets included in the pixel group, and

~~wherein~~ said dot data storage module simultaneously stores dot data with respect to at least multiple pixel sets, which are left at last in the pixel group, as the dot data with respect to the M pixel sets.

Claim 14 (Currently Amended): A printing system ~~in accordance with claim 11~~ that eventually converts original image data to be printed into dot data as data in unit of dots and prints an image in unit of raster lines as arrays of dots created according to the dot data, said printing system comprising:

a print head that has multiple dot formation elements to create dots on a printing medium;

a print head control module that prints each raster line included in the image by at least two dot formation elements;

an image data conversion module that converts the original image data into converted data, which is in a form prior to expansion into dot data corresponding to the multiple dot formation elements and is in a more compressed form than the dot data;

a converted data storage module that stores the converted data;

a data expansion module that successively reads out the stored converted data and expands the converted data into dot data for actuating the multiple dot formation elements;
and

an output module that outputs the expanded dot data to said print head control module,

wherein said image data conversion module collects a preset number of multiple pixels in the image into each pixel group and specifies a number of dots to be created in each pixel group based on the image data, so as to obtain the converted data,

said converted data storage module stores data representing the specified number of dots to be created in each pixel group as the converted data,

said data expansion module converts the stored data representing the specified number of dots into the dot data and comprises a dot data storage module, which simultaneously stores the converted dot data at least once with respect to M pixel sets included in each pixel group, where M is an integer of not less than 2 but of less than N, which is a total number of pixel sets included in the pixel group, and

~~wherein~~ said dot data storage module converts the number data into the dot data in an order of pixels having potential for dot creation in the pixel group and stores the dot data.

Claims 15 and 16 (Canceled).

Claim 17 (Currently Amended): A printing device ~~in accordance with claim 15~~ that receives data corresponding to an object image to be printed from outside of the printing device and creates dots on a printing medium, so as to print the object image according to the received data, said printing device comprising:

a print head that has multiple dot formation elements to create dots on the printing medium;

a print head control module that prints each raster line included in the image by at least two dot formation elements;

a converted data storage module that stores converted data, which is obtained by converting the object image in a form prior to expansion into dot data corresponding to the multiple dot formation elements and in a more compressed form than the dot data;

a data expansion module that successively reads out the stored converted data and expands the converted data into dot data for actuating the multiple dot formation elements;
and

an output module that outputs the expanded dot data to said print head control module,

wherein said converted data storage module stores data representing a specified number of dots to be created in each pixel group as the converted data, where a preset number of multiple pixels in the image are collected into each pixel group and the number of dots to be created in each pixel group is specified based on the image data, and

said data expansion module converts the stored data representing the specified number of dots into the dot data and comprises a dot data storage module, which simultaneously stores the converted dot data at least once with respect to M pixel sets included in each pixel group, where M is an integer of not less than 2 but of less than N, which is a total number of pixel sets included in the pixel group.

Claims 18 and 19 (Canceled).

Claim 20 (Currently Amended): A printing method ~~in accordance with claim 18~~ that eventually converts original image data to be printed into dot data as data in unit of dots and actuates multiple dot formation elements mounted on a print head according to the dot data, so as to create dots on a printing medium and print an image in unit of raster lines as arrays of dots, said printing method comprising the steps of:

converting the original image data into converted data, which is in a form prior to expansion into dot data corresponding to the multiple dot formation elements and is in a more compressed form than the dot data;

storing the converted data into a memory;

successively reading out the stored converted data and expanding the converted data into dot data for actuating the multiple dot formation elements;

arranging the expanded dot data to make each raster line included in the image formed by at least two dot formation elements; and

actuating the dot formation elements on the print head, based on the arranged dot data,

wherein said storing step stores data representing a specified number of dots to be created in each pixel group in the memory as the converted data, where a preset number of multiple pixels in the image are collected into each pixel group and the number of dots to be created in each pixel group is specified based on the image data, and

said expanding step converts the stored data representing the specified number of dots into the dot data and simultaneously stores the converted dot data at least once with respect to M pixel sets included in each pixel group, where M is an integer of not less than 2 but of less than N, which is a total number of pixel sets included in the pixel group.

Claims 21 and 22 (Canceled).

Claim 23 (Currently Amended): A printing method ~~in accordance with claim 21~~ that eventually converts original image data to be printed into dot data as data in unit of dots and actuates multiple dot formation elements mounted on a print head according to the dot data, so as to create dots on a printing medium and print an image in unit of raster lines as arrays of dots, said printing method comprising the steps of:

storing converted data in a memory, where the converted data is obtained by converting the original image data in a form prior to expansion into dot data corresponding to the multiple dot formation elements and in a more compressed form than the dot data;

successively reading out the stored converted data and expanding the converted data into dot data for actuating the multiple dot formation elements;

arranging the expanded dot data to make each raster line included in the image formed by at least two dot formation elements; and

actuating the dot formation elements on the print head, based on the arranged dot data,
wherein said storing step stores data representing a specified number of dots to be created in each pixel group in the memory as the converted data, where a preset number of multiple pixels in the image are collected into each pixel group and the number of dots to be created in each pixel group is specified based on the image data, and

said expanding step converts the stored data representing the specified number of dots into the dot data and simultaneously stores the converted dot data at least once with respect to M pixel sets included in each pixel group, where M is an integer of not less than 2 but of less than N, which is a total number of pixel sets included in the pixel group.

Claims 24-26 (Canceled).